openreach

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Suppliers' Information Note
For The Openreach Network

OPENREACH BACKHAUL EXTENSION SERVICES 100 (BES 100)

Service & Interface Description

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Enquiries relating to this document should be directed to: orsinsfa@openreach.co.uk

The End of Life (EoL) date for BES, WES, WEES and WES AGG ('Legacy Ethernet') products was the

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February 2022, briefing reference ETH053/21 – notified 8/12/21. Conditional support for these products remains in place on a 'reasonable endeavour's' basis if the following criteria are met. A replacement circuit has been ordered or the circuit is providing CNI connectivity. Full details can be found within ETH053/21.

In scope Legacy Ethernet circuits are subject to the repair service level agreement wording in Schedule 4C(i) of the Connectivity Services Contract to be found at https://www.openreach.co.uk/orpg/home/products/ethernetservices/contracts/contracts.do Briefing reference - ETH011/20 WES/WEES/BES, notified 10/03/20.

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1. Introduction

This Suppliers Information Note (SIN) describes the interface provided with Openreach Backhaul Extension Services 100 (BES 100). Also provided is some additional general information on BES and on some of the physical aspects of the NTEs currently being deployed for new customer orders.

Backhaul Extension Services (BES) are high speed, point-to-point data circuits that are permanently connected and available 24 hours a day, 365 days per year. They provide a secure link between a Communication Providers (CP) network located in a BT Exchange, using a Licensed Facility and a Communications Providers network located in his own accommodation or a Licensed Facility in the BT Exchange.

Any specific technology mentioned in this document is current as of today, however it may be subject to change in the future. Should the specification of the interface be changed, this will be notified by a new issue of this SIN. Openreach reserves the right to adapt technology to deliver BES as new developments are made. All services are delivered over an uncontended transmission path.

SPECIAL NOTICE

Openreach originally notified Industry that this Product will longer be supported as from 1 April 2018

Please refer to briefing GEN061/14 (www.openreach.co.uk)

Support has been extended until March 31st 2021. As of April 1st 2020 this support is on a reasonable endeavours basis.

Please refer to ETH014/19 WES/WEES/BES (up to and including 1Gbps) withdrawal of service for end of life notification details.
Please refer to ETH011/20 WES/WEES/BES (up to and including 1Gbps) changes to the service level agreement for change of support notification.

2. Service Outline

2.1 General

The BES 100 service is a point-to-point data service offering high bandwidth connectivity over radial distances up to 25 km between sites (15km for BES Daisy Chain). This radial (or point-to-point) distance can result in physical line plant route distances of up to 40 km. The current interface offered (i.e. the Network Terminating Equipment (NTE)) will be Fast Ethernet[1] operating at 100 Mbit/s in half or full duplex mode, with an RJ-45 physical connection. The uncontended transmission path is routed via the BT network and is cabled directly between a CP's equipment at an unbundled MDF site and a site within a CP's own network.

For enquiries concerning connection availability between particular sites and for further information on the BES 100 service please contact your Openreach Sales & Relationship Manager.

Backhaul Extension Services (BES)	100	
NTE Interface Option:	100BaseT (RJ45)	
Maximum allowable **Radial** Distances between Customer Premises / Sites:	25 km	*See Note 1*
Maximum **Route & Range** Distances between Customer Premises / Sites:	40 km	*See Note 2*
Half / Full Duplex Operation:	Full or Half Duplex	

Table 1. Table of BES100 Services & Principle Features

Note 1. This is the direct distance "as the crow flies" between the two site locations.

Note 2. The maximum Route distance is the limiting factor of either the physical transmission limit between NTEs over the provided interconnecting transmission infrastructure, or alternatively the maximum range that the service may be extended to due to other technical considerations (e.g. optical loss).
A schematic of the BES 100 service is shown in Figure 1.

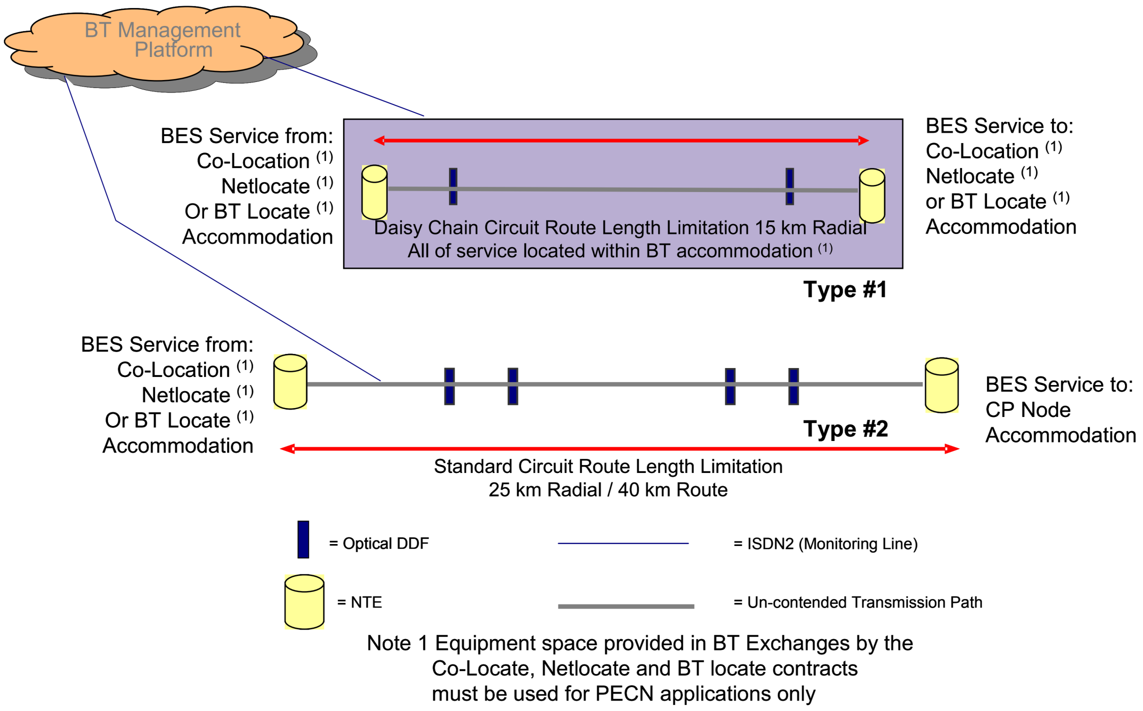
BT Management Platform
BES Service from:
Co-Location (1)
Netlocate (1)
Or BT Locate (1)
Accommodation
Daisy Chain Circuit Route Length Limitation 15 km Radial
All of service located within BT accommodation (1)
BES Service to:
Co-Location (1)
Netlocate (1)
or BT Locate (1)
Accommodation
Type #1
BES Service from:
Co-Location (1)
Netlocate (1)
Or BT Locate (1)
Accommodation
Type #2
BES Service to:
CP Node
Accommodation
Standard Circuit Route Length Limitation
25 km Radial / 40 km Route
= Optical DDF
= ISDN2 (Monitoring Line)
= NTE
= Un-contended Transmission Path
Note 1 Equipment space provided in BT Exchanges by the Co-Locate, Netlocate and BT locate contracts must be used for PECN applications only

Figure 1. BES 100 Service Configurations

Note 1. Figure 1 depicts two separate circuit scenarios, not a combined service. The upper scenario (Type #1, NTE to NTE) represents a BES circuit with where both ends have a common serving exchange. The lower scenario (Type #2, NTE to NTE via a serving exchange) represents a BES circuit which ends are served from different exchanges

Note 2. The service cannot be purchased as a point-to-point circuit directly connected between the CP and a 3rd party customer site.

In most cases BES 100 will be used to interconnect a CP's network, on physically distant sites. The BES 100 service is connected for operational support purposes to the Backhaul Extension Services management platform.

Where the service offers a duplex option, both NTEs should be configured for the same mode of operation (i.e. either Full or Half Duplex)

2.2 BES 100 Features

This service includes the IEEE 802.1d[2] Bridging functionality, which allows for the learning and filtering of traffic packets destined for those hosts connected at the local end. Packets destined for local end MAC addresses will not be forwarded across the transmission path to the distant end, after these MAC addresses have been learnt and until the system's Cache memory has been refreshed after a host has been removed.

The Full Duplex option is in accordance with IEEE 802.3x[3]. The NTE is configured by Openreach to the customer's requirements of either Half or Full Duplex at time of installation.

The BES 100 NTE is capable of transmitting frame sizes from 64 bytes to a maximum of 1548 bytes. This is to maintain compatibility with a number of frame tagging formats, in particular VLAN tagging as specified in IEEE 802.1q[4] with 1522 byte frame size.

Note: The definition of frame lengths includes the 4 byte CRC but does not include any preamble.

Where packet-loss sensitive applications such as Voice over IP (VoIP) are carried over half-duplex network arrangements, it is recommended that the throughput should not exceed 40%, to prevent any packet loss due to collisions. This is a limitation of the Ethernet protocol in half-duplex mode and not of the BES NTE itself.

The BES 100 NTE is now offered with an optional Link Loss Forwarding (LLF) feature. Openreach enables this Link Loss Forwarding feature on installation and it allows a link failure on the Openreach network to be indicated across the customer interface, so that suitably configured customers' equipment can detect such a network failure.

The overall design of the customer network and the included BES circuit will need to be within the normal operating ranges and parameters of Ethernet to operate satisfactorily.

3. Customer Interface

3.1 General

Fast Ethernet, or 100BaseT, is conventional Ethernet but faster, operating at 100 Mbit/s instead of 10Mbit/s. Fast Ethernet is based on the proven CSMA/CD Media Access Control (MAC) protocol and can use existing 10BaseT, Category 5 cabling. Data can move from 10 Mbit/s to 100 Mbit/s without protocol translation or changes to application and networking software. The BES 100 service automatically filters out local traffic, collisions and error packets.

3.2 Connector

The interface is the Network Termination Point (NTP), i.e. the point of connection on the Openreach Network Terminating Equipment (NTE) for connecting CP equipment.

The Interface consists of a RJ-45 type socket. The CP provides the category 5 connecting cords between the NTE and their own equipment. The maximum cable length is 100 metres.

The RJ-45 type connector is as specified in the 100BaseT IEEE 802.3u/x[1][3] specifications.

Attention is drawn to the Intellectual Property Rights (IPRs) set out in the preface of this agreed International standard. It is the responsibility of the supplier of LLUO equipment to ensure that they have the necessary rights from the owner of the IPR. The IPR owner has stated that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world.

The NTE connector socket pin outs are shown for information in Figure 2.

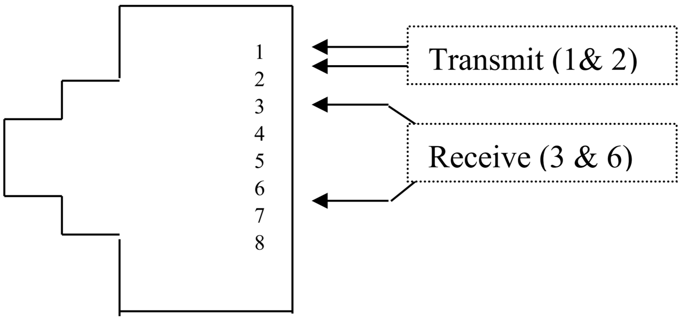

Figure 2. BES 100 NTE RJ45 Connector Pin Out Connections

4. Transmission

Fast Ethernet can maintain CSMA/CD or full duplex working as per IEEE 802.3x[3]. Fast Ethernet reduces the duration of time each bit is transmitted by a factor of 10, thus enabling the packet speed to increase tenfold from 10 Mbit/s to 100 Mbit/s. Data can be passed between Ethernet and Fast Ethernet without the need for protocol translation, because Fast Ethernet also maintains the 10BaseT error control functions as well as the frame format and length.

The NTEs are connected to the Openreach provided uncontended transmission path.

5. Power supply

5.1 General

By placing a order with Openreach the customer has accepted the conditions placed by Openreach. In relation to powering of equipment, the customer must comply with the requirements of BS7671 and the details giving within the 'DC Power Planning and Installation

Guide for WES-BES Products' document.

The BES 100 NTE is locally powered and offers AC or DC power options. The CP will be required to provide either a local 50 Hz AC supply in the form of standard 13 Amp power socket(s); or dual -50V DC power distributions and Earth connections, with all wiring colour schemes conforming to BS7671 (IEE Wiring Regulations). It will be the customers' responsibility to ensure that the power supply is fused and safe for Openreach to use. These should be in close proximity to the NTE installation location.

5.2 Installation and Testing

In addition to the NTE and Chassis powering requirements above, a 50Hz AC mains supply 13 Amp socket should also be provided for the monitoring router. Additionally, a spare 50Hz AC mains supply 13 Amp socket should also be provided in close proximity to the NTEs, to power Openreach test equipment during both initial commissioning and subsequent maintenance support activities.

5.3 AC Power Connection

AC power connection between Openreach equipment and the power socket will be made using a standard IEC320 C13-14 power lead fitted with a standard 13A plug. The NTE itself has dual power supply units internally, but only requires one AC mains supply socket.

- **For most installations:**
  This will require one power connection for each NTE provided, and the consumption of the Openreach NTE and power unit chassis in this managed service arrangement will be no more than 30 Watts per NTE.

- **For larger installations (at Openreach discretion):**
  At Openreach's discretion, where a large number of systems of one type are being deployed, a 16-slot NTE chassis version may be deployed. This will require two power connections for each 16 slot chassis provided. The consumption with a maximum number of 16 service cards provided will be no more than 200 Watts per chassis.

5.4 DC Power Connection

The DC In-Line (Molex) connector is specified as the standard method of connecting DC power by Openreach, and represents the "Demarcation Point" between Openreach and the customer. At their site, the customer is required to provide suitable power and earth connection to, and be responsible for the supply, wiring and labelling to the demarcation point. Openreach will not supply or install the DC distribution system as part of the standard Ethernet installation.

- **Customer provided wiring up to the Openreach specified In-Line connector.**
  Wiring, MCB isolation or fuse (i.e. C Type MCB or Cartage Fuse), must be provided by the customer, up to and including the DC in-line connector, as per BT's requirements stated within the 'DC Power Planning and Installation Guide for WES-BES Products' document with respect to;

  (i) Correctly rated MCB/Fuse: refer to BES product handbook for correct rating
  (ii) Correct labelling of wiring and MCB/fuse positions compliant with BS 7671,
  (iii) Correct size of cable for required voltage drop at required maximum current,

(iv) Separately fused isolatable A & B power supplies, as detailed in the 'DC Power Planning and Installation Guide for WES-BES Products' document.

The in-line connector has a maximum current handling capability of 11A, and is not to be used for equipment requiring greater than a 11A supply (such as the Nortel OPTera 5200 equipment, which require 20A feeds).

5.5 Additional Details

For further details on the provision of DC Power, see the 'DC Power Planning and Installation Guide for WES-BES Products' available on the Openreach Ethernet website.

If there is a conflict between DC power information contained in the 'DC Power Planning and Installation Guide for WES-BES Products' and the SIN document, the order of precedence shall be as follows:
(a) DC Power Planning and Installation Guide for WES-BES Products
(b) SIN

6. Further Information

For enquiries concerning connection availability between particular sites and for further product information on the BES 100 service, please contact your Openreach Customer Business manager, or see https://www.openreach.co.uk/orpg/home/products/ethernetservices/backhaulextensionservices/bes.do

7. References

[1]	IEEE 802.3u	IEEE standards for Local and Metropolitan Area Networks-Supplement: Media Access Control (MAC) Parameters, Physical Layer, Medium Attachment Units and Repeater for 100Mbits/s Operation, Type 100Base-T (Clauses 21-30)	1995
[2]	IEEE 802.1d	IEEE Recommendations for Bridging: Learning and Forwarding	
[3]	IEEE 802.3x	IEEE Standards for Local and Metropolitan Area Networks: Specification for 802.3 Full Duplex	1997
[4	IEEE 802.1q	IEEE Recommendations for Virtual LANs	1998

For further information or copies of referenced sources, please see document sources at:
https://www.openreach.co.uk/orpg/home/helpandsupport/sins/sins.do

8. Abbreviations

100BaseT	100Mbit/s twisted pair interface defined in IEEE 802.3
10BaseT	10Mbit/s Base-band twisted pair “Ethernet/IEEE 802.3” technology
BES	[BT] Backhaul Extension Services
CP	Communications Provider (Providers of Electronic Communications Services)
CPE	Customer Premises Equipment
CRC	Cyclic Redundancy Check
CSMA/CD	Carrier Sense Multiple Access / Collision Detection
DDF	Digital Distribution Frame
DSLAM	Digital Subscriber Line Access Multiplexer
ETS	European Telecommunications Standard
IEC	International Electrotechnical Commission
IP	Internet Protocol
IPR	Intellectual Property Rights
LAN	Local Area Network
LLF	Link Loss Forwarding
MAC	Media Access Control (& Hardware Device Address)
Mbit/s	Mega (10_6) bits per second
MCB	Mini Circuit Breaker
MDF	Main Distribution Frame
NTE	Network Terminating Equipment
NTP	Network Terminating Point
PoC	Point of Connect
SAN	Storage Area Network
SIN	Suppliers’ Information Note
SHDS	Short Haul Data Service
VLAN	Virtual Local Area network
VoIP	Voice Over Internet Protocol (application)

9. History

Issue	**Date**	**Notes**

1.0	27 May 2005	First Issue
1.1	29 Sep 2006	Service description updated to be Equivalence of Input compliant, block schematic changed
1.2	29 Oct 2007	Service description amended in accordance with updated DC power guidance
1.3	18 March 2009	Co-location references replaced with Licenced Facility references. In-line connector's maximum current handling capability increased to11A. Contact Point amended
1.4	March 2011	Amended to notify no new service will be made available
1.5	March 2013	Amended to notify withdrawal of modify options (Bandwidth upgrade, shift, re-site & rearrange)
1.6	April 2015	Amended to notify that this Product will longer be supported as from 1 April 2018 In section 6, Updated link for further information Change SINet site references from http://www.sinet.bt.com to http://www.btplc.com/sinet/
1.7	June 2020	Amended to notify changes to the end of life date and service level agreement. Changes to branding, from BT to Openreach including changes to reflect new Openreach SIN site and Openreach SIN email address.
1.7	June 2021	Annual Review – no changes made – issue number therefore remains the same
1.7	June 2022	Added End of Life notification and briefing
1.7	July 2023	Annual Review – no changes made – issue number therefore remains the same
1.7	August 2024	Annual Review – no changes made – issue number therefore remains the same

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